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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/667,077	09/21/2000	Xiao Chen	99-463	9032
7590	01/07/2004		EXAMINER	
Steve D Lundquist Caterpillar Inc Intellectual Property Department AB6490 100 NE Adams Street Peoria, IL 61629-6490			BARNES, CRYSTAL J	
			ART UNIT	PAPER NUMBER
			2121	
DATE MAILED: 01/07/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	<i>SL</i>
	09/667,077	CHEN ET AL.	
	Examiner Crystal J. Barnes	Art Unit 2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) Responsive to communication(s) filed on 21 September 2000.

2a) This action is FINAL.                            2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) Claim(s) 1-9 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 1-4 and 6-9 is/are rejected.

7) Claim(s) 5 is/are objected to.

8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on 21 September 2000 is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some \* c) None of:

1. Certified copies of the priority documents have been received.

2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

13) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) The translation of the foreign language provisional application has been received.

14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

1) Notice of References Cited (PTO-892)

2) Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) 1,2.

4) Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.

5) Notice of Informal Patent Application (PTO-152)

6) Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4 and 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over USPN 5,796,617 to St. Ville in view of USPN 6,295,513 B1 to Thackston.

As per claim 1, the St. Ville reference discloses a method for providing a simulation of a welding process using integrated models, the integrated models being interconnected by an interconnection tool to determine stresses and distortions of a material being welded, including the steps of: determining a model of a geometry (see columns 8-9 lines 62-4, "geometric model") of the material ("object"); defining a set of coordinates of elements (see column 9 lines 64-66, "plurality of elements") and nodes ("nodes") of the geometry model ("geometric model") for a finite element analysis mesh (see column 17 lines 15-19, "fine mesh model"); delivering the finite element analysis mesh ("fine mesh model")

coordinates to a thermal analysis model, the thermal analysis model including an analytical solution model (see column 6 lines 47-56, "solutions of the equation") and a finite element analysis model (see column 9 lines 64-66, "finite element model"); determining a thermal analysis of the welding process (see column 13 lines 33-41, "any computer controlled manufacturing process") as a function of at least one of the analytical solution model ("solutions of the equation") and the finite element analysis model ("finite element model"), the analytical solution model being adapted to provide a thermal history of the welding process for a global distortion analysis, and the finite element analysis model ("finite element model") being adapted to provide a thermal history of the welding process for a detailed residual stress analysis (see column 16-17 lines 66-4, "stress"); delivering the thermal history of the welding process to a structural analysis model; and providing a structural analysis of the welding process as a function of the thermal history.

The St. Ville does not expressly disclose the analytical solution model being adapted to provide a thermal history of the welding process for a global distortion analysis; delivering the thermal history of the welding process to a structural analysis model; and providing a structural analysis of the welding process as a function of the thermal history.

The Thackston reference discloses

(see column 25 lines 60-65, "Engineering analysis and simulation processing module 946 ... various analyses and simulations and ... may comprise stress analysis processing module 1502; ... thermal analysis processing model 1508 ...")

(see column 26 lines 9-12, "Stress analysis processing module 1502 may use finite element ... to determine the stress distribution ...")

(see column 26 lines 19-23, "Thermal analysis processing module 1508 ... stress magnitude and deformation or weakening ...")

(see column 30 lines 60-65, "... stress analysis, ... part design model as a mesh ... finite element analysis that computes stress at each point ...")

(see column 38 lines 9-11, "A part design model ... series of geometrical and topological entities ...")

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the method for manufacturing an object or part taught by the St. Ville reference to include the engineering analysis and simulation processing module of the network-based system for manufacturing taught by the Thackston reference to permit users to perform various analyses and simulations.

One of ordinary skill in the art would have been motivated to include network-based system for manufacturing so that an engineering design for a product can be designed, developed, and evaluated in a collaborative, virtual environment.

As per claim 2, The Thackston reference discloses providing a thermal history of the welding process for a detailed residual stress analysis (see column 30 lines 60-65, "stress analysis") includes the step of providing a thermal history of the welding process for a specific portion of the welding process ("finite element analysis that computes stress at each point").

As per claim 3, the St. Ville reference discloses providing a structural analysis of the welding process (see column 13 lines 33-41, "any computer controlled manufacturing process") includes the step of modeling a set of characteristics of the materials (see column 11 lines 10-39, "material property databases") being welded during the welding process ("any computer controlled manufacturing process").

The Thackston reference discloses

(see column 13 lines 43-50, "Material data 331 may contain property data ...")

As per claim 4, the Thackston reference discloses characteristics of the materials ("material property") include residual stresses and distortions (see column 26 lines 19-23, "stress magnitude and deformation or weakening ...").

As per claim 6, the Thackston reference discloses determining a thermal analysis of the welding process as a function of the finite element analysis model (see column 26 lines 9-12, "stress analysis processing module 1502") includes the step of determining a set of numerical computations of conditions at each desired node and element coordinate of the finite element analysis mesh (see column 30 lines 60-65, "... stress analysis, ... part design model as a mesh ... finite element analysis that computes stress at each point ...").

As per claim 7, the St. Ville reference discloses delivering the thermal history of the welding process to a structural analysis model includes the step of delivering the thermal history by way of an interface module (see column 15 lines 26-31, "visual display device 911").

As per claim 8, the rejection of claim 1 is incorporated and further claim 8 contains limitations recited in claim 1; therefore claim 8 is rejected under the same rationale as claim 1.

As per claim 9, the rejection of claim 1 is incorporated and further claim 9 contains limitations recited in claim 1; therefore claim 9 is rejected under the same rationale as claim 1.

*Allowable Subject Matter*

3. Claim 5 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

*Conclusion*

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents are cited to further show the state of the art with respect to solid modeling in general:

USPN 5,033,014 to Carver et al.

USPN 5,581,489 to Groothuis et al.

USPN 6,263,252 B1 to St. Ville

USPN 6,618,694 B1 to Shibuya et al.

USPN 6,324,491 B1 to Zhang et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Crystal J. Barnes whose telephone number is 703.306.5448. The examiner can normally be reached on Monday-Friday alternate Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anil Khatri can be reached on 703.305.0282. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703.305.3900.



ANIL KHATRI  
SUPERVISORY PATENT EXAMINER

cjb  
December 31, 2003